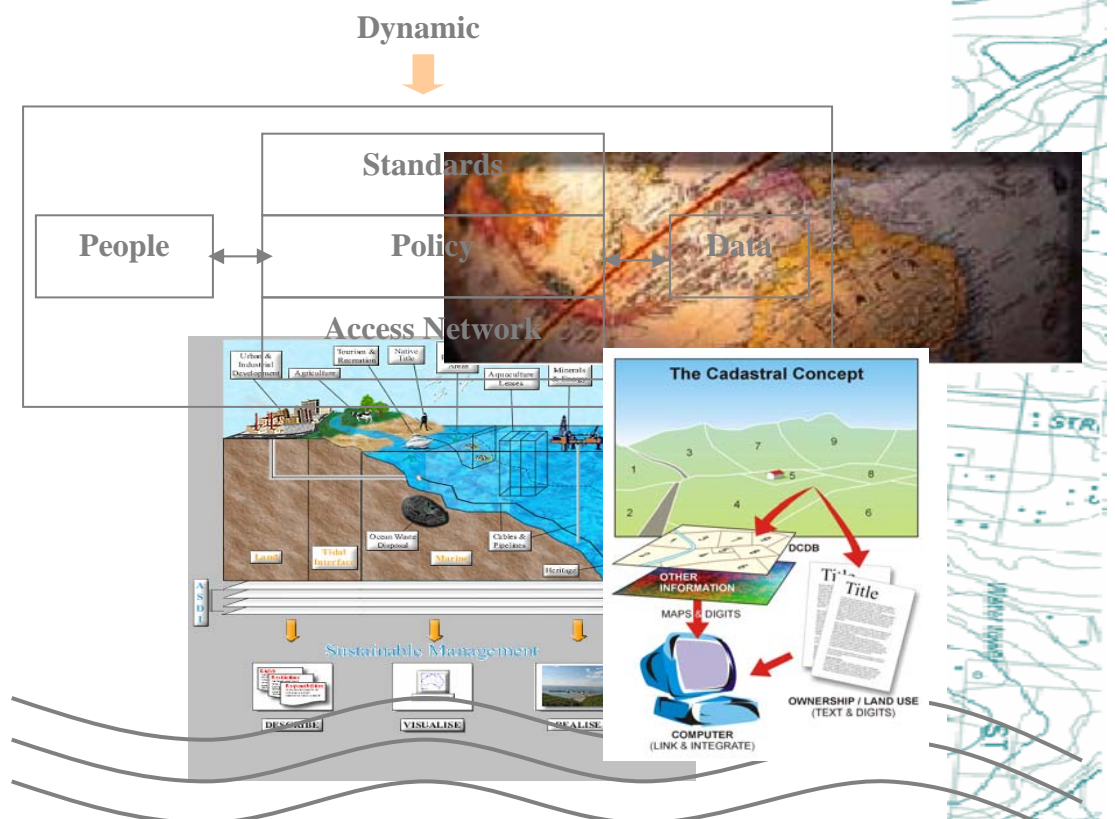




THE UNIVERSITY OF
MELBOURNE

Centre for Spatial Data Infrastructures and Land Administration
Department of Geomatics, The University of Melbourne

2002-2006 Report



Prepared by
Ian Williamson and Abbas Rajabifard
December 2006

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Centre for Spatial Data Infrastructures and Land Administration 2002-2006

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Executive Summary

This report on the activities and the achievements of the Centre for Spatial Data Infrastructures and Land Administration, covering the five years, 2002-2006, is presented to the Department of Sustainability and Environment (DSE). The Centre is now moving to its sixth year of activities since it was established by the University of Melbourne and launched by the Minister for Environment and Conservation, the Hon. Sherryl Garbutt, at the opening of the International Symposium on Spatial Data Infrastructures, hosted by the University, on 19 November 2001.

The Centre's primary objective is to undertake fundamental and applied research in the broad areas of spatial data infrastructures and land administration. The research covers problems and issues at local, state, national and multinational levels focusing on those directly relevant to state jurisdictions.

The Victorian Government, through the Department of Sustainability and Environment (DSE) is a key sponsor of the Centre and committed core funding to its operations. The Centre was established in November 2001. From 2002-2006, The University of Melbourne received \$1.3 million from the State Government to support the Centre's research, particularly to build on a global vision for virtual information infrastructures to manage the spatial data necessary to solve many of the problems of modern society. The Centre focused on large scale people related data, particularly land parcel or cadastral data. Much of the research used the states of Victoria in particular, and NSW and WA, as working laboratories to obtain data, and to test solutions and outcomes. International linkages through European and North American universities, as well as through the UN supported Permanent Committee for GIS Infrastructure for Asia and the Pacific (PCGIAP), give the Centre international opportunities to showcase Victoria's achievements in spatial data infrastructures (SDI) and land administration.

DSE funding facilitated the winning of further research grants from the Australian Research Council and the Australian Government Department of Education, Science and Training.

Research achievements put the Centre at the forefront in the development of SDI and land administration systems to delivery of sustainable development at local, state, national and multinational levels. Important roles of the Centre are research within a dynamic ICT and emerging technology environment, and the development of SDIs that are now play a much broader role in a modern society. The Centre applies best practice principles of knowledge transfer by maintaining an international profile through its website.

The international reputation of the Centre is built on its successes over the five year's of operation, summarised below:

- Over 210 publications in 2002-2006 (books, book chapters, journal and conference papers and technical reports)
- Successful completion of ten PhD theses and three MSc theses
- SDI Book-"*Developing SDIs: from concept to reality*", published by Taylor and Francis, UK, July 2003 with Foreword by Minister Mary Delahunty
- Conduct of four successful International Workshops and an Expert Group Meeting
 - **International Workshop on Cadastral Template**, Okinawa, Japan, 12-13 July 2003, www.cadastraltemplate.org

As part of the UN-PCGIAP Working Group 3 (Cadastre) and with the support of the Centre, this two-day International Workshop was successfully conducted prior to the 16th UNRCC-AP conference and 9th PCGIAP meeting. The objectives were to understand the role that the cadastre plays in a state or national SDI, and to compare best practice as a basis for improving cadastres as a key component of SDIs. 45 people from 25 countries attended.

- **International Workshop on Marine Administration-the Spatial Dimension** (as part of Marine SDI and Marine Cadastre research), Kuala Lumpur, Malaysia, 4-7 May 2004, www.marineadministration.org

As part of the UN-PCGIAP Working Group 3 (Cadastre), and with the support of the Centre, a four-day International Workshop was successfully..102 people from 11 countries attended.

- UN supported **Workshop on Data Integration**, Bangkok, Thailand, 21 September, 2006
http://www.geom.unimelb.edu.au/research/SDI_research/Integrated/workshop%20index.html

As part of the UN-PCGIAP Working Group 3 (Cadastre,) and with the support of the Centre, a one-day international workshop was organised on the ‘Integration of Built and Natural Environmental Datasets within National SDI Initiatives’. The workshop was part of the 17th UNRCC-AP Conference and 40 people from 18 countries and organisations.

- International Expert Group Meeting (EGM), on **Incorporating Sustainable Development Objectives into ICT Enabled Land Administration Systems**, Melbourne, Australia, 9-11 November 2005
http://www.geom.unimelb.edu.au/research/SDI_research/EGM/

This three-day international collaborative meeting was an important part of a research project undertaken by the Centre and funded principally by the Australian Department of Education, Science and Training, supported by the International Science Linkage program established under the Australian Government innovation statement, *Backing Australia's Ability*. The papers and presentations are published.

- Design and presentation of an **International SDI Short Course**, 19-21 Nov 2003

Following the recommendation of Resolution 5 (Capacity Building) of the 16th UNRCC-AP, and the endorsement of the 9th UN-PCGIAP meeting, 2003, Okinawa, Japan, an International Short Course on SDI was designed and run. The course focused on ‘Developing Spatial Data Infrastructures’ and 24 people who were both suppliers and users of spatial data from seven countries attended

- 10 Research Grants (DSE, ARC, DEST, UN, GA)
 - DSE-SII Research Grant- Research on SDI related topics and Land Administration Systems (2002-2006).
 - The Integration of Built and Natural Environmental Datasets in National Spatial Data Infrastructure Initiatives (2005-2007).
 - Designing Land Administration Systems to Support Modern Land Markets (2005-2007).

- Incorporating Sustainable Development Objectives into ICT enabled Land Administration Systems (2003-2006).
- A Marine Cadastre for Australia - Addressing Key Scientific and Policy Issues (mid 2003-2007).
- Integration of Built and Natural Environment Datasets in the context of National SDI Initiatives (2005-2007).
- Defining and Developing a Marine Cadastre for Australia (2002-2003).
- Development of Framework to Assess NSDI Initiatives-with Wageningen University, The Netherlands (2005-2008).
- Concepts and Principles of Virtual Australia, CRC-SI, Project 3.1 (2004-2005).
- Formulating the Next Generation of Spatial Data Infrastructures using Hierarchical Spatial Reasoning and Diffusion Theories (2001-2003).

Twenty-four personnel (former and current members) were directly involved with the research in the Centre in 2002-2006. The Centre also drew on the expertise and joint supervision of other academic staff in the Department of Geomatics.

The Visiting Fellow Program was a successful component of the Centre. In 2002-2005 the Centre hosted 20 visits from international researchers and scholars that were mutually beneficial to its research and to research partners. The DSE Visiting Fellow Program was supported by the Victorian Department of Environment and Sustainability through Land Victoria and the Spatial Information Infrastructure Group, The University of Melbourne, the Australian Department of Education, Science and Training (DEST) through the International Sciences Linkages project, and the Department of Land, NSW and Department of Land Information, WA.

The success of the Centre is fully dependent on personnel involved in it. I acknowledge all the efforts of the graduate students and researchers, and in particular Dr. Abbas Rajabifard the Deputy Director, Ms Jude Wallace, Senior Research Fellow, Mr Andrew Binns, Research Fellow, Ms Lillian Cheung (my Personal Assistant who retired in May 2005), and Ms Colleen Bermingham my current Personal Assistant.

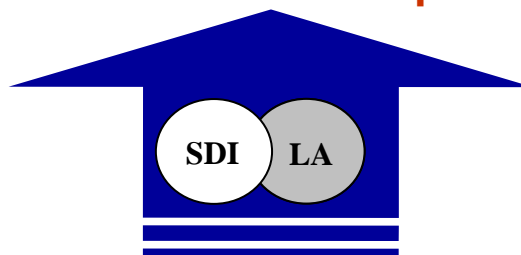
Without the support and commitment of the Victorian Government, and particularly the senior personnel in Spatial Information Infrastructure (SII) of the Department of Sustainability and the Environment, the Centre's achievements over the last five years would not have materialised. This support and trust is gratefully acknowledged.

Ian P. Williamson
Director

Center for Spatial Data Infrastructures and Land Administration

The Centre provides a focus for research in Spatial Data Infrastructures, Land Administration and related disciplines and technologies to support sustainable development at local, state, national and multinational levels. The Centre was established in 2001 within the Department of Geomatics at the University of Melbourne.

Supporting Sustainable Development



Research Focus

- Spatially enabled government and society
- SDIs design and development (in both land and marine environment)
- Land and marine administration systems
- Cadastre, land tenures and property markets
- ICT enabled land administration
- Land markets
- Geographic Information Systems (GIS); and
- Professional issues and education.

Contact Details

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Website: www.geom.unimelb.edu.au/research/SDI_research/

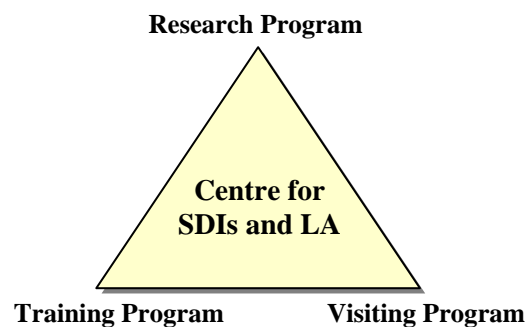
History and Background

The Department of Geomatics has been undertaking research in land administration, and more recently in Spatial Data Infrastructures (SDIs), for over a decade. However a dramatic increase in interest in spatial data and land administration infrastructures at state and federal levels in Australia and internationally occurred after 1998. This resulted in the establishment of the Spatial Data Infrastructures and Land Administration research group in the Department of Geomatics several years ago.

As a result of the activities and outcomes of this research group and the increasing importance of spatial data in society, The University of Melbourne established a Centre for Spatial Data Infrastructures and Land Administrative within its Department of Geomatics in November 2001. This Centre consolidated the successes of the research group and its linkages with the state governments of Victoria and New South Wales, the Federal Government, the United Nations, The World Bank, several universities and foreign governments.

The Centre provides a focus for research in SDIs and land administration by building on ongoing research relationships and creating new links through extended collaboration, both nationally and internationally. Between 2002 and 2006, The University of Melbourne received \$1.3 million in November 2001 in State Government funding to build on a global vision by creating virtual information infrastructures that integrate and make accessible the spatial data necessary to solve many of the problems of modern society. Driving this vision is the evolving concept of a SDI.

The activities of the Centre are based on a three pillared approach through the development of a Research Program, focused Postgraduate Training Program, and facilitated knowledge transfer, including a Visiting Scientists Program and web-enabled research findings.



Over this period, the Centre's research contributions included:

- Refinement of the concept of an SDI and adaptation of international components of SDIs to Australian federal environment.
- Marine administration, an extension of cadastral and SDI experiences into the maritime environment.
- The concept of Virtual Australia, creating an enabling platform for the delivery of spatial data and services across jurisdictions.
- iLand, an information policy for integrated, Internet accessible, interoperable and interactive land information.
- Land management paradigm to drive the four functions of land administration (tenure, use, development and value) towards delivering sustainable development. The paradigm requires Australian LAS to adapt the European land stewardship principles to local conditions.

- Spatially enabled government, where government uses transformational new technologies of spatial enablement to change its organisation and the way it does business.

The next major contribution will involve identification of the components of a spatially enabled Australia. The technical inventiveness and private sector driven developments in the USA will be investigated. This will considerably extend opportunities to showcase Victoria's, and indeed, Australia's, initiatives in LAS, electronic conveyancing and spatial technologies.

RESEARCH PROGRAM: Objectives

- To establish a leading group of world class scholars in spatial data infrastructures and land administration.
- To encourage collaborative research projects with state and federal governments in Australia, the private sector and leading overseas universities, particularly Universitas 21 institutions.
- To secure national competitive grants through the development of team-based research expertise.
- To secure state, federal and international research grants building on existing well-established collaboration.
- To disseminate research findings through academic publications, seminars and conferences.

TRAINING PROGRAM: Objectives

- To be a focus for postgraduates wishing to study in SDI and land administration.
- To provide specialized supervisory expertise in SDI and land administration.
- To develop and enhance the knowledge base and research capabilities in SDI and land administration through research, training and specific initiatives, such as workshops, symposia and conferences.

VISITING PROGRAM: Objectives

Through an existing joint initiative between the Department of Geomatics and Land Victoria, the Group administers the Land Victoria Visiting Fellows Program. This resulted in over ten international scholars in SDI and land administration visiting the University of Melbourne over the last few years. The objectives of the program include:

- To facilitate research and teaching interchanges among Australian and overseas scholars who work in SDI and land administration through a Visitors and Seminar Program.
- To increase opportunities to involve international visitors in specific initiatives such as workshops and conferences.
- To facilitate collaborative links between visitors regarding research and postgraduate training.

CENTRE MANAGEMENT

Director: Professor Ian Williamson, Professor of Surveying and Land Information

Deputy Director: Dr Abbas Rajabifard, Senior Research Fellow

Advisory Committee:

Mr Bruce Thompson (Chair)	Director, Spatial Information Infrastructure, DSE
Mr Paul Harcombe	Chief Surveyor, Land & Property Information New South Wales
Mr Peter Holland	General Manager, Mapping Science Division, Geoscience Australia
Mr Tony Wheeler	Former Chair, Australian Spatial Information Business Association
Professor Bill Charters	Professor Emeritus, Department of Mechanical and Manufacturing Engineering, and Chair, CRC-SI Board

WEBSITE

www.geom.unimelb.edu.au/research/SDI_research/

Centre's Research Team

- Professor
- Two Senior Research Fellows
- One Research Fellow
- Six PhD Students
- One Masters Student
- Admin Officer

Professor Ian Williamson

Director, Professor of Surveying and Land Information

Research: Cadastral, Land and Geographic Information Systems, Land Administration and SDI.



Dr Abbas Rajabifard

Deputy Director, Senior Research Fellow

Research: Planning, Management and Implementation of SDIs, SDI and Spatially Enabled Government concept, SDI Enabling Platform and Concepts of Virtual Australia.



Ms Jude Wallace

Senior Research Fellow

Research: Land Policy, Land Markets and Infrastructure for Land Management, Spatially Enabled Government.



Mr Andrew Binns

Research Fellow

Research Topic: Virtual Jurisdiction, Concepts and Principles of Virtual Australia, Marine Administration, SDI Enabling Platform.



Ms Colleen Bermingham

Administrative Officer



Ms Lillian Cheung (Retired in May 2005)

Administrative Officer



Dr Kevin McDougall (2006)

PhD Candidate (*Thesis passed*)

Research Topic: Modelling of Local and State Government SDI Interfaces.



Mr Rohan Bennett

PhD Candidate

Research Topic: Designing and building a system to manage property rights, restrictions and responsibilities in the 21st Century.



Mr Mohsen Kalantari

PhD Candidate

Research Topic: ICT Enabling Land Administration



Mr Michael Black

PhD Candidate

Research Topic: Current and potential contribution of global geospatial data in the international health and humanitarian aid sectors.



Mr Hossein Mohammadi

PhD Candidate

Research Topic: Integration of Built and Natural Environment Datasets as part of National SDI initiatives.



Ms Sheelan Vaez

PhD Candidate

Research Topic: Seamless SDI Model to Facilitate Spatially Enabling Land Sea Interface.



Former Members

Ms Lisa Strain (MSc 2006)

Thesis: Extension and Application of SDI to Support a Marine Dimension.



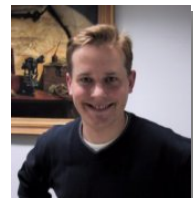
Dr Kate Darymple (PhD 2006)

Thesis: A Comparative study of Common Property Rights within Land Administration Systems: The Identification, Registration and Management of Common Property Rights.



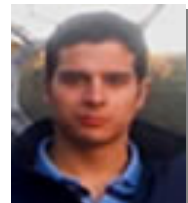
Dr Mathew Warnest (PhD 2005)

Thesis: Modelling National SDI Partnerships within Countries that are a Federation of States.



Dr Daniel Paez (PhD 2005)

Thesis: Spatial and Temporal Representation of Policy using Geographic Information Systems.



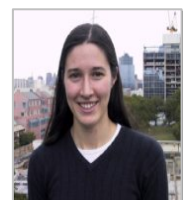
Dr Daniel Steudler (PhD 2004)

Thesis: Success Factors of Cadastral Systems and Reform Projects in the Land Administration Context.



Dr Jessica Smith (PhD 2004)

Thesis: Communications technology in relation to the dissemination of spatial data.



Dr Serryn Eagleson (PhD 2003)

Thesis: Geographic Information Systems Applied to Administrative Boundary Design.



Dr Malcolm Park (PhD 2003)

Thesis: The effect of adverse possession as to part parcel of registered title land on the land market.



Dr Lisa Ting (PhD 2002)

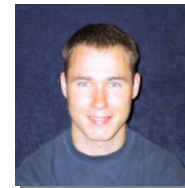
Thesis: Frameworks for institutional, legal and technological reforms in land administration to deliver sustainable development.



Mr Neil Brown

PhD Candidate (Submitting)

Research Topic: Sequential Phased Estimation of Ionospheric Path Delays for Improved Ambiguity Resolution over Long GPS Baselines.



Ms Mary-Ellen F. Feeney

PhD Candidate

Research Topic: Developing Decision-Enabled SDI.



Mr Sigit Widodo

MSc Student

Research Topics: The Concept of Marine Cadastre and Spatial Data Infrastructure in Marine Environment.



Visiting Scientists and Students

- Feb. 2006-July 2006 **Mr Christian Clausen**, Visiting Scientist and PhD student from Aalborg University, Denmark, Topic: Awareness as a Foundation for Developing Efficient Spatial Data Infrastructures.
- April 2005-June 2005 **Ms Christine Najjar**, Visiting Scientist and PhD student from University of ETHZ, Swiss, Topic: Metadata and SDI.
- Sept 2004-March 2005 **Mr Floris deBree**, Visiting Scientist and MSc student from University of Wageningen, The Netherlands, Topic: Data Sharing and Spatial Data communication between SI professionals and End-Users within SDI Initiatives.
- Jan 2004-June 2004 **Mr Ali Mansourian**, K.N.Toosi University, Iran, Topic: Developing SDI for Disaster Management.
- Jan 2003-April 2003 **Mr Joep Cromptvoets**, Visiting Scientist and Lecturer from University of Wageningen, The Netherlands, Topic: Impact Assessment of worldwide National Clearinghouse Systems.

Visiting Fellows 2002-2006

The Visiting Fellow Program was a successful component of the Centre's activities. Visits hosted by the Centre and were supported by the University of Melbourne, the DSE Visiting Fellow Program, the Department of Education, Science and Training (DEST) through The International Sciences Linkages project "Developing an ICT Enabled Land Administration", and contributions from the project partners (Department of Land, NSW; Department of Environment and Sustainability, Victoria; and Department of Land Information, WA). The visits mutually assisted research of the Centre and the work of its partners. The following researchers and scholars were involved:

2006

- **Professor Ian Masser**, Former President of GSDI and EUROGI
- **Professor Stig Enemark**, Head, School of Surveying and Planning, Aalborg University, Denmark/President of the Danish Association of Chartered Surveyors

2005

- **Professor Harlan Onsrud**, Past President of GSDI Association
- **Professor Ian Masser**, Former President of GSDI and EUROGI
- **Professor Bas Kok** Director Netherlands Council for Geographic Information-RAVI
- **Professor Holger Magel**, Chair of Land Readjustment and Rural Development, Technische Universitat Munchen, Germany/President, International Federation of Surveyors 2002-2006)
- **Professor Stig Enemark**, Head, School of Surveying and Planning, Aalborg University, Denmark/President of the Danish Association of Chartered Surveyors
- **Professor van der Molen**, Director of Kadastre International, and Professor of Cadastre and Land Administration ITC, The Netherlands
- **Dr Daniel Stuedler**, SwissTopo, Swiss Federal Directorate of Cadastral Surveying.

2004

- **Professor Michael Batty**, Director, Centre for Advanced Spatial Analysis at University College London (major sponsor: Department of Primary Industries, Victoria)
- **Professor John McLaughlin**, President and Vice-Chancellor, University of New Brunswick, Canada
- **Professor Terry Moore**, Professor of Satellite Navigation/Director, Institute of Engineering Surveying and Space Geodesy, University of Nottingham, UK
- **Mr. Darius Bartlett**, Department of Geography, University College Cork, Ireland
- **Professor Esben Sorensen**, Department of Development and Planning, Aalborg University, Denmark.

2003

- **Professor Holger Magel**, Chair of Land Readjustment and Rural Development, Technische Universität München, Germany/President, International Federation of Surveyors 2002-2006
- **Professor Stig Enemark**, Head, School of Surveying and Planning, Aalborg University, Denmark/President of the Danish Association of Chartered Surveyors
- **Professor Lothar Gruendig**, Geodesy and Adjustment Calculations, Technische Universität Berlin;
- **Mr Paul Kelly**, Executive Director, ANZLIC.

2002

- **Professor Kate Beard**, Chair, Department of Spatial Information Science and Engineering, University of Maine/Board member, Cartography and Geographic Information Science Society, USA
- **Professor Michael Worboys**, National Centre for Geographic Information and Analysis, Department of Spatial Information Science and Engineering University of Maine, USA (former Head, Department of Computer Science, Keele University, UK).

Research Grants and Work Program

1. DSE-SII Research Grant (2002-2006)

Research on SDI related topics and land administration systems mainly related to aspects of the Victorian Spatial Information Strategy and similar issues.

2. Department of Education, Science & Training, International Science Linkage Program

Project on Incorporating Sustainable Development Objectives into ICT enabled Land Administration Systems (2003-2006).

As part of this project, an International Expert Group Meeting (EGM) was organised in Melbourne, 2005. This three-day international collaborative meeting was an important part of a research project by the Centre for the Department of Education, Science and Training, supported by the International Science Linkage program established under the *Australian Government innovation statement, Backing Australia's Ability*. EGM proceedings were published by the Department.

Finalised in 2006.

3. ARC Linkage-Projects

Project 1: A Marine Cadastre for Australia - Addressing Key Scientific and Policy Issues (mid 2003-2007). Joint industry partners – DSE Victoria, Department of Land Information Western Australia, Department of Lands New South Wales, Land Information New Zealand.

Project 2: Integration of Built and Natural Environment Datasets in the context of National SDI Initiatives (2005-2007). Joint industry partners – DSE Victoria, Department of Lands New South Wales, and GeoScience Australia (GA).

Project 3: Defining and Developing a Marine Cadastre for Australia (2002-2003). Joint industry partners – Land Victoria, Geoscience Australia and Department of Natural Resources & Mines Queensland.

Finalised in mid 2004.

4. ARC Discovery Project

Project on Designing land administration systems to support modern land markets (2005-2007). The project examines building titles and land information as commodities in modern markets.

5. Research Project with Wageningen University, The Netherlands

Project on Development of Framework to Assess NSDI Initiatives (2005-2008). This research project is part of the “Space for Geo-information” Research program in the Netherlands.

6. Collaboration with CRC-SI

Activity 1: Coordination and Management of CRC-SI Research Program 3

Spatial Information System Design and Spatial Data Infrastructures.

Finalised in mid 2005.

Activity 2: Coordination and leadership of CRC-SI Research, Project 3.1: Concepts and Principles of Virtual Australia (2004-2005).

Finalised in mid 2005.

7. ARC Strategic Partnerships with Industry – Research & Training (SPIRT) Grants

Formulating the Next Generation of Spatial Data Infrastructures using Hierarchical Spatial Reasoning and Diffusion Theories (2001-2003). Joint industry partners – Land Victoria, Department of Lands New South Wales.

Finalised in 2003.

8. Department of Education, Science & Training, International Science Linkage Program

Project 1: Incorporating Sustainable Development Objectives into ICT enabled Land Administration Systems (2003-2006).

Project 2: Research to support export of Australian expertise in land administration and marine cadastre (2002-2004)-Research and work related to the Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP) Working Group 3 (Cadastre) – coordination and management of Cadastral Template Project (www.cadastraltemplate.org) and Marine Administration component (<http://www.geom.unimelb.edu.au/maritime/marineresearch.htm>).

Finalised in 2004.

Publications 2002-2006

www.geom.unimelb.edu.au/research/SDI_research/group_publ.htm

(Most Publications are Available Online)

Over 210 Publications

- 2 edited books
- 27 book chapters
- 44 journal papers (3 in review)
- 96 conference papers
- 13 professional magazine publications
- 17 technical reports
- 10 PhD thesis
- 3 MSc thesis

Year	Books	Book Chapters	Journal Papers	Conference Papers	Profession -al	Technical Reports	Total	MSc	PhD
2002	-	2	9	20	-	4	35	1	2
2003	1	13	9	17	1	3	44	-	2
2004	-	1	9	19	3	3	35	1	2
2005	-	1	3	27	7	1	39	-	2
2006	1 Proceedings	10	14	13	2	6	46	1	2
Total	2	27	44	96	13	17	199	3	10

Book/ Proceeding

- Williamson IP, Enemark S, Wallace J. (Eds), 2006, Sustainability and Land Administration Systems. Sustainability and Land Administration Systems, ISBN 0-7325-1624-2, The University of Melbourne, 254 pages.
- Williamson, I.P., Rajabifard, A. and Feeney, M. (Eds), 2003, Developing Spatial Data Infrastructures: From Concept to Reality, ISBN 0-415-30265-X, Taylor & Francis, U.K. 313 pages.

Book Chapters

- Bennett, R., Wallace, J. and Williamson, I. 2006, Achieving sustainability objectives through better management of property rights, restrictions and responsibilities, Williamson, Enemark and Wallace (eds), Sustainability and Land Administration Systems, ISBN 0-7325-1624-2, The University of Melbourne, 197-212.

- Bennett, R., Wallace, J., Williamson, I.P. 2006, Organising land information for sustainable land administration, (In Review), *Journal of Land Use Policy*.
- Binns, A., Wallace, J. and Williamson, I., 2006, Building titles, Williamson, Enemark and Wallace (eds), Williamson, Enemark and Wallace (eds), *Sustainability and Land Administration Systems*, ISBN 0-7325-1624-2, The University of Melbourne, 223-232.
- Kalantari, M., Rajabifard, A., Wallace, J. and Williamson, I. 2006, An interoperability toolkit for e-Land administration, Williamson, Enemark and Wallace (eds), *Sustainability and Land Administration Systems*, ISBN 0-7325-1624-2, The University of Melbourne, 213-222.
- Kalantari, M., Rajabifard, A., Wallace, J. and Williamson, I., 2006, Spatially Referenced Legal Property Objects, (In Review), *Land Use Policy Journal*.
- McDougall, K, Rajabifard, A and Williamson, I.P, 2006, A Mixed Method Approach for Evaluating Spatial Data Sharing Partnerships for SDI Development, in H Onsrud (ed.), *Research and Theory in Advancing Spatial Data Infrastructure Concepts*, ESRI Press, Redlands, CA. (In Press).
- Mohammadi, H., Rajabifard, A., Binns, A. and Williamson, I. 2006, Facilitating Multi-sourced Data Integration in the Context of National SDI Initiatives, (In Review), *International Journal of Geographic Information Science*.
- Najar, C., Rajabifard, A., Williamson, I.P. and Giger, C. 2006, A Framework for Comparing Spatial Data Infrastructures on the basis of Web Services and Metadata Management-An Australian-Swiss Case Study, in H Onsrud (ed.), *Research and Theory in Advancing Spatial Data Infrastructure Concepts*, ESRI Press, Redlands, CA. (In Press).
- Rajabifard, A., Williamson, I.P. and Binns, A. 2006, Marine Administration Research Activities within Asia and the Pacific Region – Towards a Seamless Land-Sea Interface, in *Administering Marine Spaces: International Issues*, The International Federation of Surveyors (FIG) Publication No. 36, E ISBN 87-90907-55-8, Denmark, pp. 21-36.
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- Rajabifard, A. and Binns, A. 2006, SDI Requirements of Land Administration, *Sustainability and Land Administration Systems*, Williamson, Enemark and Wallace (eds), *Sustainability and Land Administration Systems*, ISBN 0-7325-1624-2, The University of Melbourne, 181-189.
- Wallace, J. Williamson, I. and Enemark, S. 2006, Building a national vision for spatially enabled land administration in Australia, Williamson, Enemark and Wallace (eds), *Sustainability and Land Administration Systems*, ISBN 0-7325-1624-2, The University of Melbourne, 237-250
- Wallace, J. and Williamson, I. 2006, Building sustainability accounting in land administration systems in Australia, Williamson, Enemark and Wallace (eds), *Sustainability and Land Administration Systems*, ISBN 0-7325-1624-2, The University of Melbourne, 31-40.
- Williamson, I.P., Rajabifard, A., and Binns, A., 2006, The Role of Spatial Data Infrastructures in Delivering an Enabling Platform for Decision Making, in H Onsrud (ed.), *Research and Theory in Advancing Spatial Data Infrastructure Concepts*, ESRI Press, Redlands, CA. (In Press).
- Mansourian, A., Rajabifard, A., Valadan Zoej, M.J., 2005, Development of a Web-Based GIS Using SDI for Disaster Management, In *Geo-Information for Disaster Management*, (Eds. P. van Oosterom, S. Zlatanova, E. M. Fendel), Springer, pp 599-608.
- Williamson, I.P. 2004, The Role of Spatial Data Infrastructures in Sustainable Development. *Festschrift – Nachhaltige Entwicklung von Stadt und Land, Holger Magel zum 60. Geburtstag*, 459-464.

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- Eagleson, S. and Escobar S. 2003, Administrative Boundary Design in Support of SDI Objectives. *Developing Spatial Data Infrastructures: from Concept to Reality*. ISBN 0-415-30265-X, Taylor & Francis, U.K. 249-262.
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